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ALFALFA VARIETIES

~ ~ IN THE ~ ~
~ UNITED STATES ~



THE COMMERCIAL ALFALFAS of the United States may be divided into four somewhat distinct groups, each containing strains or varieties that vary considerably within themselves: (1) The common alfalfa group, (2) the Turkistan group, (3) the variegated group, and (4) the nonhardy group.

In many parts of the United States tests have been going on for some years with alfalfa from various sources, for the purpose of determining the variety or strain that can be most profitably grown in a specific locality or under certain conditions.

As a result of these tests it is now possible to designate with considerable definiteness the part of the country where each of the various commercial strains or varieties may be expected to give the most satisfactory results.

The purchaser of seed is aided materially in obtaining the kind desired by the registration and certification service in many States; the United States Verification Service; and the staining requirements of imported seed.

This bulletin is a revision of and supersedes Farmers' Bulletin 1467, Commercial Varieties of Alfalfa.

ALFALFA VARIETIES IN THE UNITED STATES¹

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VARIETIES AND STRAINS OF ALFALFA

PRIOR TO 1898 there was no commercial recognition of alfalfa varieties in the United States whether of foreign or domestic origin, but as attempts to grow the crop spread to areas where conditions were less favorable, differences in behavior became apparent. This finally resulted in the recognition and adoption of several fairly distinct commercial varieties and strains that show great diversity in their relations to climate and latitude. Some give the best results in the North, where the winters are cold and the days are long during the growing season, while others do better in the extreme South, where the winters are mild and the days during the summer are shorter than in the Northern States.

The commercial alfalfas of the United States may be divided into four somewhat distinct groups, each containing strains² or varieties that vary considerably within themselves. These groups may be briefly described as follows:

The common group includes the ordinary purple-flowered, smooth alfalfa, of which there are numerous regional strains that have developed naturally in the western part of the United States and in foreign countries (fig. 1).

¹ This bulletin is devoted mainly to a discussion of the varieties and strains of alfalfa that are of commercial importance in the United States. A few varieties that are not grown commercially but that are of interest because of resistance to cold or disease or because of peculiar adaptation have also been included. No attempt has been made to discuss many other alfalfas that have been grown experimentally from time to time.

² In this bulletin the word "strain" is applied to alfalfas that are only slightly different from those that are typical of the ordinary purple-flowered alfalfa and also occasionally to alfalfas that belong to other groups where they are considered with reference to these groups. The alfalfas of the common group that have developed in various regions are called "regional strains," since they do not possess sufficiently distinct characteristics to be considered as varieties.

The Turkistan group includes alfalfas that originated in Turkistan. They are similar in flower color to the common alfalfas, but the growth is generally somewhat shorter and more spreading. No commercial distinction is made between the various strains as imported from Turkistan, but in the United States the names Hardistan and Kaw are given to strains of Turkistan alfalfa, seed of which is being increased in this country.

The variegated group includes alfalfas that have originated from crosses between common alfalfa (*Medicago sativa*) and the yellow-flowered species (*M. falcata*). Grimm, Canadian Variegated, Cosack, Baltic, Ladak, and Hardigan are the best known examples of this group.



FIGURE 1.—A good crop of common alfalfa in the Yakima Valley, Wash.

The nonhardy group includes rather distinct varieties that are in general very erect in habit of growth, recover quickly after cutting, have a long growing period, and are very susceptible to low temperatures. The Peruvian and Arabian varieties are members of this group.

THE COMMON-ALFALFA GROUP .

Comparatively little is known regarding the origin of common alfalfa, though there is reason to believe that it developed in western Asia and was one of the first plants to be cultivated solely for forage. The stock from which most of the common alfalfa of our Western States has been produced was brought from Spain to Chile and, after having been grown there for many years, was introduced in California about 1850. In most lots of common alfalfa there are plants that grow more quickly than others after being cut and that have a tendency to produce larger yields. These plants are favored by a mild climate and for convenience are referred to as the "southern or nonhardy type." The plants that recover more slowly after being cut and that become dormant earlier in the fall are more cold-

resistant and are referred to as the "northern or hardy type." These various types furnish a basis for regional strains which, as they are at present defined, are produced when common alfalfa is grown for several seed generations in definite localities where eliminating conditions of one kind or another normally prevail. None of the common alfalfas tested thus far has shown any appreciable resistance to bacterial wilt.

DOMESTIC STRAINS

The various strains of common alfalfa produced in the United States are usually distinguished by the name of the State, as Kansas or Montana Common, or else by some term descriptive of the condition under which the seed is produced, such as "dry-land", "irrigated", and "nonirrigated" alfalfa. The environment under which alfalfa is grown undoubtedly has an important influence on its characteristics, but just how many seed generations are required to bring about a distinct change doubtless varies with the eliminating climatic conditions and cannot be estimated accurately.

The so-called "regional strains" that have developed in the Dakotas and Montana have a tendency to recover more slowly after being cut than those produced farther south and, being more cold-resistant, are preferable where winter-killing occurs rather frequently. Such strains are generally less productive at the lower latitudes than the more southern strains. The strains produced in the Southwest, often called Chilean alfalfa, recover rapidly after being cut but are very susceptible to cold and are likely to suffer serious winter injury except in the most Southern States. Common alfalfas produced in Kansas and Oklahoma are intermediate between the northern and southern types as regards cold resistance and rapidity of recovery after being cut. These strains are recommended for sections having a latitude similar to that in which the seed was produced and where winter-killing normally is not a serious factor.

The common alfalfas produced in the intermountain region vary somewhat in winter hardiness. In general they have given fairly satisfactory results where Kansas Common succeeds, though seemingly in general slightly less cold resistant. Tests conducted by the United States Department of Agriculture have not so far shown any material advantage of dry-land or nonirrigated alfalfa over seed produced under irrigation.

ARGENTINE ALFALFA

During the fiscal years 1920 to 1925, inclusive, the average annual importation of seed from Argentina amounted to about 4,000,000 pounds and created much interest in the suitability of Argentine seed for various parts of the United States. Practically all the Argentine alfalfa belongs to the common group, though several more or less distinct strains have developed as a result of having been grown under widely varying conditions of climate and latitude. Most of the seed that reaches the United States is produced south of Buenos Aires, where the climatic conditions are much less severe than those

at a similar latitude in this country and therefore not conducive to the development of a hardy strain. The tests thus far conducted in the United States indicate that some strains of Argentine alfalfa are less hardy and that the hardiest strains are no hardier than our Kansas Common. For this reason Argentine alfalfa cannot be sown with safety any farther north than Kansas alfalfa is known to succeed. In the southern part of the United States some strains of Argentine alfalfa compare favorably with the domestic strains of common alfalfa.

Under the Federal Seed Act amendment, approved April 26, 1926, 10 percent of the seed of Argentine alfalfa must be stained orange-red before it is permitted entry, indicating that it is of agricultural value only in limited areas.

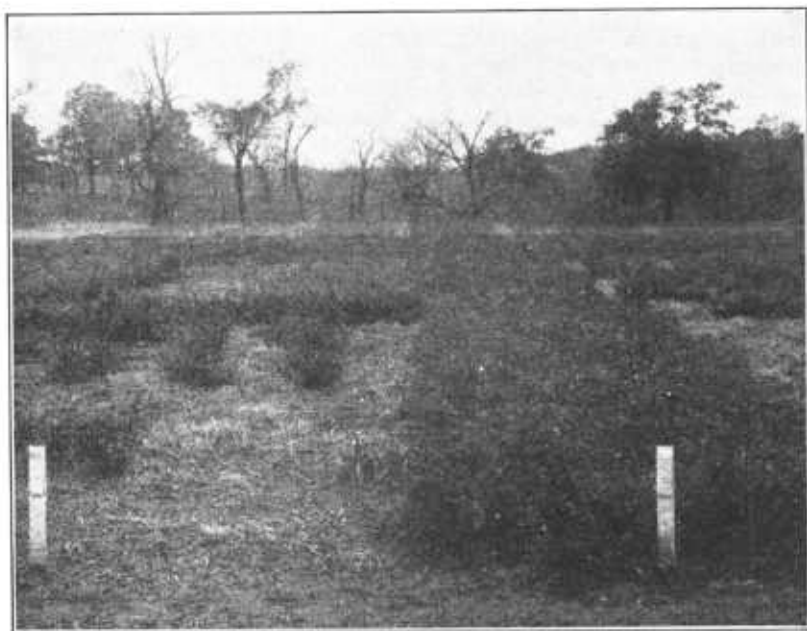


FIGURE 2.—Winter-killing in South African alfalfa (left) as compared with Canadian Variegated (right). (Courtesy Iowa Agricultural Experiment Station.)

SOUTH AFRICAN ALFALFA

During the fiscal years 1920 to 1925, enough alfalfa seed was imported from South Africa to stimulate interest in its suitability for the United States. Most lots of South African seed that have been tested have proved to be somewhat less cold-resistant than Kansas Common (fig. 2). Even where the South African alfalfa survives the winter satisfactorily it has shown no advantage over the adapted strains of domestic alfalfa.

Under the Federal Seed Act amendment, 10 percent of the South African alfalfa seed must be stained red before it is permitted entry, indicating that it is not adapted to general agricultural use in the United States.

PROVENCE ALFALFA

Provence is the name that is applied to a strain of alfalfa grown in southeastern France. It differs so slightly from the common regional strain produced in Kansas that one can scarcely be distinguished from the other. There are, however, a few differences of some importance. Provence begins growth earlier in the spring and continues to grow later in the fall in the southern part of the United States than does the strain from Kansas. It also makes somewhat quicker growth after being cut. However, it is not quite so hardy and cannot be recommended generally north of the central part of the United States.

Under the Federal Seed Act amendment, 1 percent of the alfalfa seed produced in France must be stained green before it is permitted entry.

TURKISTAN GROUP

Alfalfas of the Turkistan group include Turkistan, Hardistan, and Kaw, all of Turkistan origin either directly or indirectly. They are characterized by slow recovery after being cut, early fall dormancy, susceptibility to leaf diseases, resistance to cold and bacterial wilt, and low seed yields.

TURKISTAN

Turkistan alfalfa was first introduced into the United States through the efforts of the United States Department of Agriculture in 1898. The superior cold resistance of the early importations resulted in a demand for Turkistan seed for sowing in the cold, dry regions of the northern Great Plains. During the years 1908 to 1915 and 1920 to 1928, considerable seed was received through commercial channels, but since 1928 very little seed has been imported from Turkistan. Unfortunately, much of the seed imported was sown in the East, where it gave very unsatisfactory results, and various means were employed to warn growers against the use of Turkistan seed, particularly in the East and South. Recently, however, interest in Turkistan alfalfa has revived, mainly as a result of its resistance to bacterial wilt, a disease responsible for serious losses especially in some of the best alfalfa-growing districts of the Middle West and far West.

As compared with the commercial strains of common alfalfa grown in this country, Turkistan alfalfas are usually characterized by purple flowers; lower and somewhat more spreading growth; smaller and slightly more hairy leaves; and fine stems, but it is almost impossible even for a trained botanist to distinguish between individual plants of Turkistan alfalfa and those of the common American strains. In comparative tests Turkistan alfalfa has produced relatively low yields of seed.

Comprehensive tests have shown considerable variation in the cold and wilt resistance of Turkistan alfalfas, but fortunately seed from the main producing districts in that country has shown a rather high degree of resistance to both. In the absence of bacterial wilt some of our domestic alfalfas have been consistently more productive than Turkistan alfalfa. Even where wilt occurs, many alfalfas though susceptible to the disease usually give better yields for 2 or 3 years, but where stands are to remain longer Turkistan alfalfa will

yield more in the later years. In parts of Utah and possibly elsewhere Turkistan has seemed to be more susceptible to bacterial stem blight than other alfalfas.

Experiments indicate that where bacterial wilt is destructive Turkistan alfalfa can be used to advantage in the States lying west of the Mississippi River and from Kansas northward. In certain parts of Utah the value of Turkistan alfalfa where wilt occurs is apparently limited by its susceptibility to bacterial stem blight. It has not given good results in the East, partly because of its susceptibility to leaf diseases, and partly because of its tendency to become dormant early in the fall, thus permitting weeds to invade the field and gradually crowd out the alfalfa. Both of these characteristics contribute to the short survival of Turkistan fields under humid conditions. Because of its low productivity in the Southern States, Turkistan alfalfa has not shown any promise even where bacterial wilt is prevalent.

Alfalfa seed produced in Turkistan can usually be identified by the presence of seed of Russian knapweed (*Centaurea picris*), which it almost invariably contains. This seed is considerably larger than alfalfa seed, of an oblong shape, and of an ivory-whitish color. Russian knapweed has become established in certain parts of the West, where it is regarded as a dangerous pest.

Under the Federal Seed Act amendment, 10 percent of the Turkistan alfalfa seed must be stained purple-red before it is permitted entry, indicating that it is of agricultural value in limited areas where bacterial wilt is prevalent.

HARDISTAN

Hardistan is the name given by the Nebraska Agricultural Experiment Station to a promising strain of Turkistan alfalfa grown in that State several years, seed of which was originally obtained through commercial channels. In comparative tests it has reacted very similarly to some of the commercial strains of Turkistan alfalfa as to cold and wilt resistance, susceptibility to leaf diseases, early fall dormancy, and productivity of seed and forage. Where wilt is prevalent certain domestic alfalfas are generally more productive for 2 or 3 years, but where the stands are to be maintained several years the average annual yields of Hardistan are likely to be greater, owing to the gradual thinning out of the susceptible alfalfas by the disease. Hardistan alfalfa can be used to advantage under the same conditions as Turkistan alfalfa, and like Turkistan, produces relatively low yields of seed under most conditions. The supply of commercial seed has been rather limited, but efforts are being made to increase the production, and it is anticipated that considerable seed will soon be available.

KAW

Kaw is the name given by the Kansas Agricultural Experiment Station to an alfalfa that was originally imported as Provence alfalfa from France but later found to be of Turkistan origin. Being similar in all respects to some of the better lots of commercial Turkistan alfalfa, Kaw is adapted for growing in the same parts of the United States. While the seed is not as yet commercially available, attempts are being made to increase the supply.

VARIEGATED GROUP

The variegated alfalfas have resulted from a natural cross between the purple-flowered and the yellow-flowered species. The predominant color of the flowers is similar to ordinary alfalfa, but brown, green, greenish-yellow, and smoky flowers are not uncommon, and pure yellow flowers are found occasionally. It is because of this range in flower color that the designation "variegated" is applied to the group. The various members of the group are often so similar that it is impossible to distinguish between them, but there is usually little difficulty in distinguishing between the common and variegated alfalfas by the color of the flowers and shape of the pods. As a rule, the alfalfas of this group are more resistant to cold than common alfalfas, probably because of the presence of the yellow-flowered blood in their ancestry. With the exception of Ladak, none of them has shown any appreciable resistance to bacterial wilt.

GRIMM

Grimm alfalfa is the most important member of the variegated group in the United States. It was introduced from Germany into Carver County, Minn., in 1857 by Wendelin Grimm and eventually attracted considerable attention on account of its cold resistance.

To the casual observer Grimm alfalfa differs little from the common strains, but a closer examination will reveal a greater diversity of forms. While the flowers are mainly similar to common alfalfa in color, the presence of variegated flowers characteristic of the group indicates definitely that the Grimm alfalfa is the result of a cross between the common and the yellow-flowered species. Variegated flowers are usually more in evidence in semiarid than in humid districts.

The hardiness of the Grimm alfalfa is probably due in part to the presence of yellow-flowered alfalfa in its ancestry and in part to the process of natural selection that took place under the severe climatic conditions to which it was subjected for many years in Minnesota. On account of its superior hardiness the variety is particularly recommended for all the Northern States where winter-killing is a serious factor (figs. 3 and 4). In the southern half of the United States it is less productive than some of the less hardy and more rapid growing alfalfas.

In ability to produce seed Grimm alfalfa is at least the equal of common alfalfa.

COSSACK

Cossack alfalfa was introduced into this country from Russia through the efforts of the United States Department of Agriculture in 1907. It is an earlier generation hybrid between the common and yellow-flowered alfalfa than Grimm, and for this reason the flowers show a higher percentage of variegation, the yellow and white flowers being more abundant. In certain tests Cossack has yielded somewhat more than Grimm and other variegated alfalfas, but on the whole it has not shown evidence of being appreciably superior for most conditions. It is adapted for growing under practically the same conditions as Grimm alfalfa.

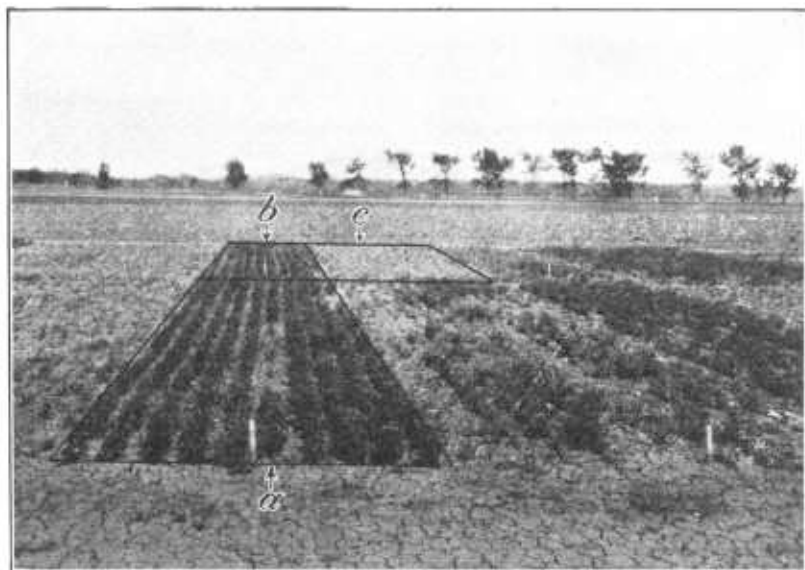


FIGURE 3.—Effect of cold on alfalfa varieties at Ames, Iowa: *a*, Grimm; *b*, Canadian Variegated; *c*, Hairy Peruvian. (Courtesy Iowa Agricultural Experiment Station.)

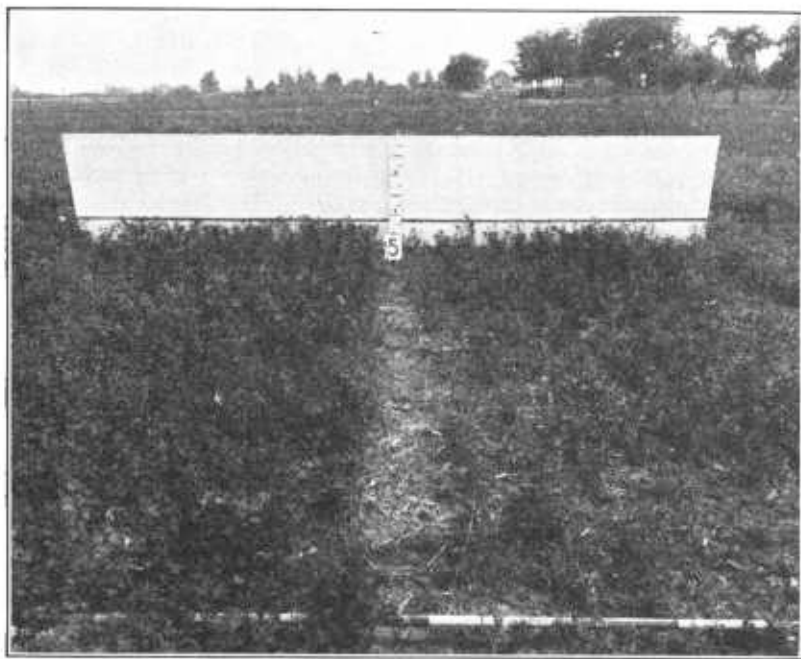


FIGURE 4.—Winter-killing in Utah Common alfalfa (right) as compared with Grimm alfalfa (left). (Courtesy Iowa Agricultural Experiment Station.)

CANADIAN VARIEGATED

Canadian Variegated, or Ontario Variegated, is the name given to an alfalfa of hybrid origin grown in eastern Canada for many years. It is very similar to the Grimm variety as to flower color and general habit of growth. In fact, these two varieties are so much alike that it is seldom possible to distinguish one from the other. Canadian Variegated also compares very favorably with Grimm in yield of seed and hay, but, like it, does not usually yield so much as common alfalfa where the latter survives the winter without injury. It has proved more cold-resistant than common alfalfa and is adapted to about the same general region as Grimm (figs. 2 and 3). In New England and other States having approximately the same latitude, its superior hardiness as compared with ordinary alfalfa has been pretty well demonstrated. In tests conducted in the northern Great Plains it has not usually survived the winters quite so well as the Grimm.

Under the Federal Seed Act amendment, 1 percent of the seed must be stained iridescent violet before it is permitted entry.

LADAK

In 1910 a small quantity of alfalfa seed was obtained from Ladak, northern India, through the efforts of the United States Department of Agriculture, and a little later several other small packets were obtained from the same source. This alfalfa appeared very promising in the preliminary tests in the northern Great Plains, where it suffered less winter injury and generally was more productive than most other alfalfas. When it seemed likely to become of commercial importance the name Ladak was assigned to it.

No other alfalfa grown commercially in the United States shows such a wide variegation in growth habits of individual plants, some being very desirable and others undesirable, thus offering an excellent source of material for selection. Plants obtained from the original seedings were predominantly yellow-flowered, but hybridization in subsequent generations has resulted in a gradual increase in the proportion of purple flowers. The variety, however, still shows more variegation with a greater percentage of yellow flowers than any other alfalfa in the group.

In the region where Ladak alfalfa is adapted one of its outstanding characteristics is its ability to make an exceptionally heavy first crop. As it exceeds all other varieties in this respect, it is especially valuable where only one good cutting is normally obtained. It recovers slowly after being cut, and as a result the second and third crops of other varieties often exceed in yield those obtained from Ladak. Because of the heavy first cutting, however, the total seasonal yield of Ladak is often in excess of that of other varieties.

Like Turkistan, Ladak alfalfa has a tendency to become dormant early in the fall. Being relatively free from leaf diseases, it retains its leaves remarkably well, and thus yields a high quality of hay. It has also shown considerable resistance to bacterial wilt, though not equal to that of the alfalfas of the Turkistan group in this respect.

In many tests Ladak alfalfa has proved superior to all others for the cold and dry conditions found in the northern Great Plains, and it has also given good results under irrigation in the Northwest.

Even as far south as Manhattan, Kan., yields obtained from Ladak have compared very favorably with those obtained from other alfalfas. Where wilt is prevalent in this general region, Ladak has considerable advantage over other variegated and common alfalfas. East of the Mississippi River, the variety has given variable results. It has stood at or near the top in yield in a few tests conducted as far east as Ohio. Farther east Ladak alfalfa, like Turkistan, has not appeared promising, owing apparently in part to its slow recovery after being cut and to its tendency to become dormant early in the fall, giving an opportunity for weeds to invade a field, thus gradually crowding out the alfalfa. It is not suited to the southern half of the United States.

There is at present a considerable acreage of Ladak alfalfa, principally in Montana and Oregon, and during favorable seasons considerable seed is produced though the price is still relatively high.

BALTIC

There is no authentic record of the introduction of Baltic alfalfa into this country, although there is no doubt that the original stock came from Europe. The name Baltic was first applied to it in 1906, for the reason that it had been grown for about 10 years near Baltic, S.Dak., and not, as has been supposed, in the Baltic Sea region of Europe.

This alfalfa differs slightly from Grimm alfalfa in some minor details, but the two are so similar that it is seldom possible to distinguish one from the other, and the description as given for the Grimm variety applies equally well to Baltic. In some tests Baltic alfalfa has slightly exceeded Grimm and in others the reverse has been true, but in general the two varieties may be considered of about equal value.

Baltic alfalfa has unquestionably been developed in much the same way as Grimm and therefore owes its hardiness to the same causes, the presence of the yellow-flowered alfalfa in its ancestry and the natural elimination of the less hardy plants as a result of having been grown under severe climatic conditions.

This variety is best suited for sections where the ordinary alfalfas suffer considerable winter-killing. These sections include practically the same territory as that to which Grimm is best adapted.

HARDIGAN

Hardigan alfalfa is a selection from Baltic made at the Michigan Agricultural College for its high seed production and as a desirable forage type. In general growth habits it is similar to Grimm and other variegated alfalfas. The flowers, however, are largely purple, very little variegation being in evidence. Hardigan alfalfa blossoms more freely and, where conditions are conducive to seed setting, produces larger yields of seed than almost any other alfalfa. In many parts of the East, however, it has not produced profitable yields of seed in most seasons, indicating that the problem of seed production under humid conditions cannot be solved by its use. In cold resistance and productivity it is similar to Grimm and Baltic alfalfa and is, therefore, adapted to about the same region as other variegated alfalfas, namely, the Northern States where winter-killing is likely to be serious.

SAND LUCERN

Sand lucern, a member of the variegated group, is no longer grown commercially as such in the United States. Numerous lots of seed have been tested in the past, and considerable variation has been noted in cold resistance and growth habits. It is believed that the Grimm, Baltic, and Canadian Variegated alfalfas are the result of natural selection from the sand lucern of Europe.

NONHARDY GROUP

There are certain alfalfas distinct from the regional strains of common alfalfa that have been developed in the southern part of this country. These alfalfas are especially characterized by long periods of growth, by ability to make better growth under short days than the hardier northern strains, and by quick recovery after being cut. Because they are so much more seriously affected by low temperatures than the other commercial varieties or strains, for lack of a better group designation they have been classed as nonhardy alfalfas. Included in the group are such alfalfas as Peruvian, Arabian, and India, though only the Peruvian alfalfas have attained any degree of commercial importance in the United States. All nonhardy alfalfas tested for wilt resistance have proved highly susceptible.

PERUVIAN

Peruvian alfalfa was first introduced into the United States through the efforts of the United States Department of Agriculture in 1899. Two distinct types have been noted in alfalfas from Peru, differing in several respects but most noticeably in the abundance of hairs on the leaves and stems. These two alfalfas are distinguished by the names "smooth Peruvian" and "hairy Peruvian." At one time there was a considerable acreage of smooth Peruvian in Arizona, but it has gradually decreased in importance. At present only the hairy Peruvian is receiving much attention, and even it seems to be gradually declining in popularity.

As compared with common alfalfa, the Peruvians are more upright, less branched, and have fewer and somewhat coarser stems, though in thick stands this difference is not marked. The most striking characteristic of hairy Peruvian is the pubescence or hairs on the whole plant, giving the foliage a grayish appearance.

The Peruvian alfalfas are characterized by their rapid growth, quick recovery after being cut, and in sections having a mild climate, by their ability to grow in cold weather and short days after the growth of ordinary alfalfa has ceased. Under such conditions they begin growth earlier in the spring and continue to grow later in the fall than most other commercial varieties, thus lengthening the growing period and therefore giving more cuttings during the season. Hairy Peruvian exhibits this characteristic to a somewhat greater degree than smooth Peruvian.

Lack of hardiness will always confine Peruvian alfalfa to the southern and southwestern portions of the United States, where the winter temperatures are comparatively mild (fig. 3). It cannot be grown to advantage in regions where the temperature falls below 10° F., and efforts to extend its culture into the Central and Northern States are unwarranted and sure to result disadvantageously. Peruvian alfalfa is not drought-resistant and therefore is not to be recommended for dry-farming sections.

ARABIAN

Arabian alfalfa was introduced into the United States in 1902 and first attracted attention because of its rapid growth. It has a tendency to be short-lived but because of its rapid growth might be of value in short rotations. At present, however, there is no known source from which seed can be obtained in commercial quantities.

YELLOW-FLOWERED GROUP

The yellow-flowered alfalfas are of no commercial importance since very little seed is available, but, being very cold-resistant, they are of interest for hybridizing with purple-flowered alfalfa in an effort to produce a hardier variety. They exhibit a wide range in growth habits, some being prostrate and others upright. Even the upright types ordinarily produce only one satisfactory cutting, and the yields are therefore relatively low. Furthermore, seed is produced in small quantities and shatters badly. At one time there was considerable interest in two yellow-flowered alfalfas, Orenberg and Semipalatinsk, but no seed is commercially available at present.

VARIETIES FOR VARIOUS SECTIONS

In many parts of the United States tests have been going on for some years with alfalfa from various sources, the objective being to determine the variety or strain that can be most profitably grown in a specific locality or under certain conditions. As a result of these tests it is now possible to designate with considerable definiteness the part of the country where each of the various commercial strains or varieties may be expected to give the most satisfactory results.

The common alfalfas vary considerably in hardiness, depending mainly upon the conditions under which a particular strain has developed. Their range of adaptation covers much of the United States, the northern and more cold-resistant strains being best suited for growing in the Northern States and the southern nonhardy strains for the Southern States. In general, common alfalfa may be expected to give fairly satisfactory results in the latitude in which the seed has been grown for several seed generations. Even the hardiest strains of common alfalfa are not dependable where the winters are particularly severe. The hardier variegated alfalfas are much to be preferred under such conditions.

The Grimm, Cossack, Baltic, Canadian Variegated, and Hardigan varieties are more cold-resistant than any of the common alfalfas and may be used to advantage from about the fortieth parallel northward and at higher altitudes farther south. There are many areas within this region where soil and climatic conditions are particularly favorable to the growth of alfalfa and where some of the common alfalfas may be used to advantage, especially in short rotations, the seed being somewhat cheaper. Even under these more favorable conditions, however, the variegated alfalfas have generally been somewhat more productive in the northern half of the United States. They have usually been inferior to the common alfalfas in the South.

Ladak alfalfa is adapted to the part of the country lying west of the Mississippi River and from Kansas northward, being especially valuable for the cold, dry conditions in the northern Great Plains and for areas where bacterial wilt is prevalent. In limited tests Ladak has succeeded fairly well in Northern States as far east

as Ohio, but from this point eastward it has not compared very favorably with other variegated alfalfas. It is not adapted to the southern half of the United States.

Turkistan, Hardistan, and Kaw alfalfas are recommended for wilt-infested soils west of the Mississippi and from Kansas northward. They have not generally given good results in the Eastern or Southern States.

Peruvian alfalfa, like strains of common alfalfa grown in the Southwest, can be used to advantage only where the winters are mild. The section to which this alfalfa is adapted includes the greater part of California, except the mountainous portions, southern Arizona, southern New Mexico, southern Texas, and the coastal region of the South Atlantic and Gulf States.

SAFEGUARDS IN PURCHASING SEED

At one time, farmers encountered difficulty in obtaining seed of the kind of alfalfa desired owing to misrepresentation, intentional or otherwise, and serious losses were incurred from sowing unadapted seed. This situation, however, has been largely remedied, and by observing the registration and certification requirements in many States, the United States Verification Service requirements, and the seed-staining regulations as applied to imported seed the purchaser may be reasonably sure of the variety and origin of the seed.

Several States register and certify seed as to variety, each package bearing a tag to this effect. Varieties so registered and certified include Grimm, Cossack, Baltic, Ladak, Hardigan, and, in some States, seed from fields of common alfalfa of long standing.

The United States Verification Service verifies the origin or place where the seed was grown without regard to the variety, quality, purity, or germination. Each package of such seed bears the United States Verification tag.

An amendment to the Federal Seed Act³ approved April 26, 1926, requires that alfalfa seed from foreign countries be stained before it is permitted entry into the United States. In accordance with the provisions of this amendment and of regulations issued thereunder, alfalfa seed is prohibited entry unless complying with the following requirements as to staining.

In the case of alfalfa seed from any foreign country, 1 percent of the seed in each container is to be colored green with the following exceptions:

- Seed from Turkistan, 10 percent purple-red.
- Seed from Africa, 10 percent red.
- Seed from South America, 10 percent orange-red.
- Seed from Canada, 1 percent iridescent violet.
- Seed of unknown origin, 10 percent red.

In some cases seed represented to be Grimm alfalfa is offered as "Affidavit Grimm." Tests conducted by the United States Department of Agriculture indicate that such seed cannot always be relied upon as being true to name, since some of the lots have been found to consist largely or in part of common alfalfa.

³ For the complete text of the regulations, see Service and Regulatory Announcements No. 9, Joint Resolutions * * * under the Federal Seed Act * * *, of the Bureau of Plant Industry, issued July 1926, and notices nos. 4 and 5, issued under sec. 5 of the Federal Seed Act, Apr. 2, 1927, and Mar. 27, 1933, respectively.

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